

CLAIMS

We claim:

1. A method for reducing contaminants in a processing chamber having an inner wall by seasoning the processing chamber inner wall; the method comprising the steps of:

forming a first USG film over the processing chamber inner wall;

5 forming an FSG film over the first USG film;

forming a second USG film over the FSG film; and

forming a nitrogen-containing film over the second USG film;

wherein the first USG film, the FSG film, the second USG film and the nitrogen-containing film comprise a UFUN season film.

2. The method of claim 1, wherein the first USG film is from about 2400 to 2600Å thick, the FSG film is from about 650 to 750Å thick, the second USG film is from about 2700 to 2900Å thick and the nitrogen-containing film is from about 1300 to 1500Å thick.

3. The method of claim 1, wherein the first USG film is from about 2450 to 2550Å thick, the FSG film is from about 675 to 725Å thick, the second USG film is from about 2750 to 2850Å thick and the nitrogen-containing film is from about 1350 to 1450Å thick.

4. The method of claim 1, wherein the first USG film is about 2500Å thick, the FSG film is about 700Å thick, the second USG film is about 2800Å thick and the nitrogen-containing film is about 1400Å thick.

5. The method of claim 1, wherein the nitrogen-containing layer is comprised of a material selected from the group consisting of SiON and SiN.

6. The method of claim 1, wherein the nitrogen-containing layer is SiON.

7. The method of claim 1, including the step of cleaning the chamber inner wall before forming the USG film over the chamber inner wall.

8. The method of claim 1, further including the step of performing three production runs before the chamber plasma processing region components cleaning step.

9. The method of claim 1, wherein:

the first USG film is formed using the parameters including:

about 20 seconds by time	Ar-side: about 95 sccm
turbo about 50 mT	Ar-top: about 15 sccm
about 3500 W RF, about 1W side-RF	O ₂ -side: about 270 sccm
0 W OFF	O ₂ -top: about 20 sccm

SiH₄-side: about 180 sccm

SiF₄: 0 sccm;

the FSG film is formed using the parameters including:

about 3 seconds by time	Ar-side: about 95 sccm
turbo about 50 mT	Ar-top: about 15 sccm
about 3500 W RF, about 1W side-RF	O ₂ -side: about 270 sccm
0 W OFF	O ₂ -top: about 20 sccm
	SiH ₄ -side: about 180 sccm
	SiF ₄ : 5 sccm;

the second USG film is formed using the parameters including:

about 25 seconds by time	Ar-side: about 95 sccm
turbo about 50 mT	Ar-top: about 15 sccm
about 3500 W RF, about 1W side-RF	O ₂ -side: about 270 sccm
0 W OFF	O ₂ -top: about 20 sccm
	SiH ₄ -side: about 180 sccm
	SiF ₄ : 0 sccm; and

the nitrogen-containing film is formed using the parameters including:

	Ar-side: about 95 sccm
turbo about 50 mT	Ar-top: about 15 sccm
about 3500 W RF, about 1W side-RF	O ₂ -side: about 270 sccm
0 W OFF	O ₂ -top: about 20 sccm
	N ₂ : about 400 sccm.

10. The method of claim 1, wherein the UFUN season film resists plasma ion bombardment.

11. A method for reducing contaminants in a processing chamber having an inner wall by seasoning the processing chamber inner wall; the method comprising the steps of:

forming a first USG film over the processing chamber inner wall;

5 forming an FSG film over the first USG film;

forming a second USG film over the FSG film; and

forming an SiON film over the second USG film;

wherein the first USG film, the FSG film, the second USG film and the SiON film comprise a UFUN season film.

12. The method of claim 11, wherein the first USG film is from about 2400 to 2600 \AA thick, the FSG film is from about 650 to 750 \AA thick, the second USG film is from about 2700 to 2900 \AA thick and the SiON film is from about 1300 to 1500 \AA thick.

13. The method of claim 11, wherein the first USG film is from about 2450 to 2550 \AA thick, the FSG film is from about 675 to 725 \AA thick, the second USG film is from about 2750 to 2850 \AA thick and the SiON film is from about 1350 to 1450 \AA thick.

14. The method of claim 11, wherein the first USG film is about 2500 \AA thick, the FSG film is about 700 \AA thick, the second USG film is about 2800 \AA thick and the SiON film is about 1400 \AA thick.

15. The method of claim 11, including the step of cleaning the chamber inner wall before forming the USG film over the chamber inner wall.

16. The method of claim 11, further including the step of performing three production runs before the chamber plasma processing region components cleaning step.

17. The method of claim 11, wherein:

the first USG film is formed using the parameters including:

about 20 seconds by time	Ar-side: about 95 sccm
turbo about 50 mT	Ar-top: about 15 sccm
about 3500 W RF, about 1W side-RF	O ₂ -side: about 270 sccm
0 W OFF	O ₂ -top: about 20 sccm
	SiH ₄ -side: about 180 sccm
	SiF ₄ : 0 sccm;

the FSG film is formed using the parameters including:

about 3 seconds by time	Ar-side: about 95 sccm
turbo about 50 mT	Ar-top: about 15 sccm
about 3500 W RF, about 1W side-RF	O ₂ -side: about 270 sccm
0 W OFF	O ₂ -top: about 20 sccm
	SiH ₄ -side: about 180 sccm
	SiF ₄ : 5 sccm;

the second USG film is formed using the parameters including:

about 25 seconds by time	Ar-side: about 95 sccm
turbo about 50 mT	Ar-top: about 15 sccm
about 3500 W RF, about 1W side-RF	O ₂ -side: about 270 sccm

0 W OFF

O₂-top: about 20 sccm

SiH₄-side: about 180 sccm

SiF₄: 0 sccm; and

the nitrogen-containing film is formed using the parameters including:

turbo about 50 mT

Ar-side: about 95 sccm

about 3500 W RF, about 1W side-RF

Ar-top: about 15 sccm

0 W OFF

O₂-side: about 270 sccm

O₂-top: about 20 sccm

N₂: about 400 sccm.

18. The method of claim 11, wherein the UFUN season film resists plasma ion bombardment.

19. A method for reducing contaminants in a processing chamber having an inner wall by seasoning the processing chamber inner wall; the method comprising the steps of:

forming a first USG film over the processing chamber inner wall; the first

5 USG film being from about 2400 to 2600Å thick;

forming an FSG film over the first USG film; the FSG film being from about 650 to 750Å thick;

forming a second USG film over the FSG film; the second USG film being from about 2700 to 2900Å thick; and

10 forming an SiON film over the second USG film; the SiON film the SiON film is from about 1300 to 1500Å thick from about 1300 to 1500Å thick;

wherein the first USG film, the FSG film, the second USG film and the SiON film comprise a UFUN season film.

20. The method of claim 19, wherein the first USG film is from about 2450 to 2550Å thick, the FSG film is from about 675 to 725Å thick, the second USG film is from about 2750 to 2850Å thick and the SiON film is from about 1350 to 1450Å thick.

21. The method of claim 19, wherein the first USG film is about 2500Å thick, the FSG film is about 700Å thick, the second USG film is about 2800Å thick and the SiON film is about 1400Å thick.

22. The method of claim 19, including the step of cleaning the chamber inner wall before forming the USG film over the chamber inner wall.

23. The method of claim 19, further including the step of performing three production runs before the chamber plasma processing region components cleaning step.

24. The method of claim 19, wherein:

the first USG film is formed using the parameters including:

about 20 seconds by time Ar-side: about 95 sccm

turbo about 50 mT Ar-top: about 15 sccm

about 3500 W RF, about 1W side-RF O₂-side: about 270 sccm

0 W OFF O₂-top: about 20 sccm

SiH₄-side: about 180 sccm

SiF₄: 0 sccm;

the FSG film is formed using the parameters including:

about 3 seconds by time

Ar-side: about 95 sccm

turbo about 50 mT

Ar-top: about 15 sccm

about 3500 W RF, about 1W side-RF

O₂-side: about 270 sccm

0 W OFF

O₂-top: about 20 sccm

SiH₄-side: about 180 sccm

SiF₄: 5 sccm;

the second USG film is formed using the parameters including:

about 25 seconds by time

Ar-side: about 95 sccm

turbo about 50 mT

Ar-top: about 15 sccm

about 3500 W RF, about 1W side-RF

O₂-side: about 270 sccm

0 W OFF

O₂-top: about 20 sccm

SiH₄-side: about 180 sccm

SiF₄: 0 sccm; and

the nitrogen-containing film is formed using the parameters including:

Ar-side: about 95 sccm

turbo about 50 mT

Ar-top: about 15 sccm

about 3500 W RF, about 1W side-RF

O₂-side: about 270 sccm

0 W OFF

O₂-top: about 20 sccm

N₂: about 400 sccm.

25. The method of claim 19, wherein the UFUN season film resists plasma ion bombardment.